



# 270 V, 200 W Pulsed DC/DC Converter with Integral EMI Filter

## ADDC27008PB

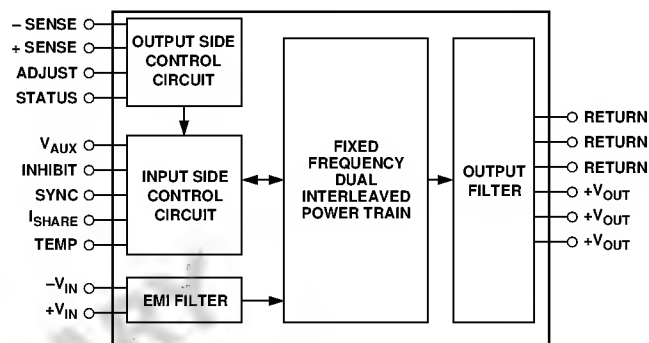
### FEATURES

270 V dc Input, 8 V dc @ 25 A, 200 W Pulse Output  
Integral EMI Filter  
Ultrafast Transient Response  
Minimal Output Voltage Deviation  
Low Weight: 80 Grams  
NAVMAT Derated  
Many Protection and System Features

### APPLICATIONS

Distributed Power Architecture for Driving T/R Modules  
Motor and Actuator Drivers

### FUNCTIONAL BLOCK DIAGRAM



### GENERAL DESCRIPTION

The ADDC27008PB hybrid military dc/dc converter is compensated specifically for pulse applications where fast transient response and minimum output voltage deviation are required. It is also designed to deliver very high, pulsed output power. The unit is designed for high reliability and high performance applications where saving space and/or weight are critical.

The ADDC27008PB has been characterized over a wide variety of load conditions. Its transient response has been set to insure output stability over a broad range of load capacitance. For applications that require factory modified compensation optimized for a specific load, or for applications that require a different output voltage than 8 V dc, contact the factory.

The ADDC27008PB is available in a hermetically sealed, molybdenum based hybrid package and is easily heatsink mountable. For MIL-STD-883 devices, contact the factory for availability.

### PRODUCT HIGHLIGHTS

1. 120 W/cubic inch pulsed power density with an integral EMI filter
2. Ultrafast transient response time with minimum output voltage deviation
3. Light weight: 80 grams
4. Operational and survivable over a wide range of input conditions: 160 V–440 V dc; survives low line, high line
5. High reliability; NAVMAT derated
6. Protection features include:
  - Output Overvoltage Protection
  - Output Short Circuit Current Protection
  - Thermal Monitor/Shutdown
  - Input Overvoltage Shutdown
  - Input Transient Protection
7. System level features include:
  - Current Sharing for Parallel Operation
  - Logic Level Disable
  - Output Status Signal
  - Synchronization for Multiple Units
  - Input Referenced Auxiliary Voltage Supply

REV. 0

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One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106, U.S.A.  
Tel: 617/329-4700 World Wide Web Site: <http://www.analog.com>  
Fax: 617/326-8703 © Analog Devices, Inc., 1997

# ADDC27008PB- SPECIFICATIONS

## ELECTRICAL CHARACTERISTICS

( $T_C = +25^\circ\text{C}$ ,  $V_{IN} = 270\text{ V dc} \pm 0.5\text{ V dc}$ , unless otherwise noted; full temperature range is  $-55^\circ\text{C}$  to  $+90^\circ\text{C}$ ; all temperatures are case and  $T_C$  is the temperature measured at the center of the package bottom.)

Parameter	Case Temp	Test Level	Conditions	ADDC27008PB			Units
				Min	Typ	Max	
INPUT CHARACTERISTICS							
Steady State Operating Input Voltage Range <sup>1</sup>	Full	VI	I <sub>O</sub> = 1.25 A to 25 A Pulsed	180	270	350	V
Abnormal Operating Input Voltage Range (Per MIL-STD-704D) <sup>1</sup>	Full	VI	I <sub>O</sub> = 1.25 A to 20 A Pulsed	160		440	V
No Load Input Current	+25°C	VI			45	100	mA
Disabled Input Current	+25°C	VI			1	5	mA
OUTPUT CHARACTERISTICS <sup>2,3</sup>							
Output Voltage (V <sub>O</sub> )	+25°C	I	I <sub>O</sub> = 1.25 A to 25 A, V <sub>IN</sub> = 180 V to 350 V dc	7.92	8.00	8.08	V
	Full	VI	I <sub>O</sub> = 1.25 A to 25 A, V <sub>IN</sub> = 180 V to 350 V dc	7.84		8.16	V
	Full	VI	I <sub>O</sub> = 1.25 A to 20 A, V <sub>IN</sub> = 160 V to 440 V dc	7.84		8.16	V
Line Regulation	+25°C	VI	I <sub>O</sub> = 25 A Pulsed, V <sub>IN</sub> = 180 V to 350 V dc		1	5	mV
Load Regulation	+25°C	VI	V <sub>IN</sub> = 270 V dc, I <sub>O</sub> = 1.25 A to 25 A Pulsed		2.5	10	mV
Output Ripple/Noise <sup>4</sup>	+25°C	I	I <sub>O</sub> = 25 A, 5 kHz - 2 MHz BW		40	60	mV p-p
Output Current (I <sub>O</sub> ) <sup>5</sup>	Full	VI	V <sub>IN</sub> = 180 V to 350 V dc, Pulsed	1.25		25	A
Output Overvoltage Protection	+25°C	V	I <sub>O</sub> = 25 A, Open Remote Sense Connection		120		% V <sub>O</sub> nom
Output Current Limit	+25°C	V	V <sub>O</sub> = 90% V <sub>OUT</sub> Nom		130		% I <sub>O</sub> max
Output Short Circuit Current	+25°C	I	45 mΩ ≤ R <sub>SHORT</sub> Circuit ≤ 60 mΩ			40	A
ISOLATION CHARACTERISTICS							
Isolation Resistance	+25°C	I	Input to Output or Any Pin to Case at 500 V dc	100			M Ω
DYNAMIC CHARACTERISTICS <sup>4</sup>							
Step Changes In Load (min to max)	+25°C	I	(Reference Section Entitled "Transient Response")				
Step Changes In Load (max to min)			(Reference Section Entitled "Response at End of Pulse")				
Soft Start Turn-On Time	+25°C	I	I <sub>O</sub> = 25 A, From Inhibit High to Status High		6	10	ms
THERMAL CHARACTERISTICS							
Efficiency	+25°C	I	I <sub>O</sub> = 12.5 A	78	79		%
	Full	VI	I <sub>O</sub> = 12.5 A	78			%
	+25°C	I	I <sub>O</sub> = 25 A	74	75		%
	Full	VI	I <sub>O</sub> = 25 A	72.5			%
Hottest Junction Temperature <sup>5</sup>	+90°C	V	I <sub>O</sub> = 25 A		110		°C
CONTROL CHARACTERISTICS							
Clock Frequency	Full	VI	I <sub>O</sub> = 2 A	0.85		0.99	M Hz
ADJUST (Pin 3) V ADJ	+25°C	I		3.1	3.2	3.3	V
STATUS (Pin 4)							
V <sub>OH</sub>	+25°C	I	I <sub>OH</sub> = 400 μA	2.4	4.0		V
V <sub>OL</sub>	+25°C	I	I <sub>OL</sub> = 1 mA		0.15	0.7	V
V <sub>AUX</sub> (Pin 5)							
V <sub>O</sub> (nom)	+25°C	I	I <sub>AUX</sub> = 5 mA, Load Current = 12.5 A	14.9	15.15	15.4	V
INHIBIT (Pin 6)							
V <sub>IL</sub>	+25°C	I				0.5	V
I <sub>IL</sub>	+25°C	I	V <sub>IL</sub> = 0.5 V			1.2	mA
V <sub>I</sub> (Open Circuit)	+25°C	I				15	V
SYNC (Pin 7) <sup>6</sup>							
V <sub>IH</sub>	+25°C	I		4.0			V
I <sub>IH</sub>	+25°C	I	V <sub>IH</sub> = 7.0 V			150	μA
I <sub>SHARE</sub> (Pin 8)	+25°C	I	I <sub>O</sub> = 20 A	2.45	2.55	2.65	V
TEMP (Pin 9)	+25°C	V			3.90		V

### NOTES

<sup>1</sup>440 V dc upper limit rated for transient condition of up to 50 ms. 160 V dc lower limit rated for continuous operation during emergency condition. Steady state and abnormal input voltage range require source impedance sufficient to insure input stability at low line. See sections entitled System Instability Considerations and Input Voltage Range.

<sup>2</sup>Measured at the remote sense points.

<sup>3</sup>Tests performed at low continuous load and 200 W pulsed load. Unit does not regulate to zero load. Refer to section entitled Internal "Start-Up Circuit".

<sup>4</sup> $C_{LOAD} = 1,000\text{ }\mu\text{F}$ . Output ripple/noise measured at converter output; may be smaller at external load capacitance. Unit is stable for  $C_{LOAD}$  ranging from 500  $\mu\text{F}$  to 4,000  $\mu\text{F}$ .

<sup>5</sup>Refer to section entitled "Pulse Output Power vs. Pulse Length" for more information.

<sup>6</sup>Unit has internal pull-down; refer to section entitled Pin 7 (SYNC).

Specifications subject to change without notice.

## ABSOLUTE MAXIMUM RATINGS\*

INHIBIT	450 V dc, -0.5 V dc
SYN C	8.0 V dc, -0.5 V dc
I <sub>SHARE</sub>	6 V dc, -0.5 V dc
T E M P	12 V dc, -0.3 V dc
Common-Mode Voltage, Input to Output	500 V dc
Lead Soldering T emp (10 sec)	+300°C
Storage T emperature	-65°C to +150°C
M aximum Junction T emperature	+150°C
M aximum Case Operating T emperature	+125°C

\*Absolute maximum ratings are limiting values, to be applied individually, and beyond which the serviceability of the circuit may be impaired. Functional operability under any of these conditions is not necessarily implied. Exposure of absolute maximum rating conditions for extended periods of time may affect device reliability.

## ORDERING GUIDE

Device	Operating Temperature Range (Case)	Description
ADD C27008PBK V	-40°C to +85°C	Hermetic Package
ADD C27008PBT V	-55°C to +90°C	Hermetic Package
ADD C27008PBT V/Q M L E*	-55°C to +125°C	Hermetic Package

\*Contact factory for Standard Microcircuit Drawing number and availability.

## EXPLANATION OF TEST LEVELS

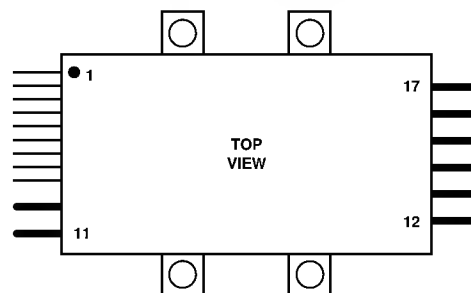
### Test Level

- I - 100% production tested.
- II - 100% production tested at +25°C, and sample tested at specified temperatures.
- III - Sample tested only.
- IV - Parameter is guaranteed by design and characterization testing.
- V - Parameter is a typical value only.
- VI - All devices are 100% production tested at +25°C. 100% production tested at temperature extremes for military temperature devices; guaranteed by design and characterization testing for industrial devices.

## PIN DESCRIPTIONS

Pin No.	Name	Function
1	-SENSE	Feedback loop connection for remote sensing output voltage. Must always be connected to output return for proper operation.
2	+SENSE	Feedback loop connection for remote sensing output voltage. Must always be connected to +V <sub>OUT</sub> for proper operation.
3	ADJUST	Adjusts output voltage setpoint.
4	STATUS	Indicates output voltage is within ±5% of nominal. Active high referenced to -SENSE (Pin 1).
5	V <sub>AUX</sub>	Low level dc auxiliary voltage supply referenced to input return (Pin 10).
6	INHIBIT	Power Supply Inhibit. Active low and referenced to input return (Pin 10).
7	SYN C	Clock synchronization input for multiple units; referenced to input return (Pin 10).
8	I <sub>SHARE</sub>	Current share pin which allows paralleled units to share current typically within ±5% at full load; referenced to input return (Pin 10).
9	T E M P	Case temperature indicator and temperature shutdown override; referenced to input return (Pin 10).
10	-V <sub>IN</sub>	Input Return.
11	+V <sub>IN</sub>	+270 V Nominal Input Bus.
12	+V <sub>OUT</sub>	+8 V dc Output.
13	+V <sub>OUT</sub>	+8 V dc Output.
14	+V <sub>OUT</sub>	+8 V dc Output.
15	RET U R N	Output Return.
16	RET U R N	Output Return.
17	RET U R N	Output Return.

## PIN CONFIGURATION



## CAUTION

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulate on the human body and test equipment and can discharge without detection. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.

